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Research Notes: Another major gene for resistance to Phytophthora megasperma var. sojae in soybeans

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1) Another major gene for resistance to *Phytophthora megasperma* var. *sojae* in soybeans

L62-904 has resistance (Table 1) to some races of *Phytophthora megasperma* var. *sojae* (*Pms*). L62-904 was developed by Dr. R. L. Bernard at Urbana from Harosoy^{6} x T240; it was an F_2 selection from an F_1 - BC_5 plant that was *Ps ps* W_1 w_1. It was used at Harrow as a w_1w_1 'Harosoy' isoline with white flowers/green hypocotyls as a genetic marker in crosses before it was discovered to have *Pms* resistance. The origin of parents used in crosses to L62-904 is given in Table 2.

Results (Tables 3, 4 and 5) indicate that L62-904 carries a single gene for resistance and that this gene is not at the Rps_1, Rps_3 and Rps_4 loci. Also, it is not at the locus of the gene in 'Altona' and the gene in 'Kingwa'. The symbol Rps_5 is proposed for the L62-904 gene. Rps_5 could be at the Rps_2 locus but there is no proof that Rps_3 (Mueller et al., 1978) and Rps_4 (Athow et al., 1980) are not at Rps_2 either.

Acknowledgment

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References

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Table 1

Disease reactions of soybeans in response to races of *Pms*

	Race							
	1	2	3	4	5	6-7	8	9
L62-904	R	R	R	R	R	S	R	R
Rps_1	R	R	S	S	S	S	S	S
$Rps_1{}^b$	R	S	R	R	R	R	R	R
$Rps_1{}^c$	R	R	R	S	S	R	R	R
Rps_2	R	R	R	R	R	S	S	R
Rps_3	R	R	R	R	R	S	R	R
Rps_4	R	R	R	R	S	S	S	S
Altona - Rps	R	R	R	R	S	S	S	S
Kingwa - Rps	R	R	R	R	R	R	R	R

R = Resistant S = Susceptible

Table 2

Parents used in crosses with L62-904

Harrow lines	Genes
OX693: Harosoy 63 x Altona	"Altona - Rps"
OX696: Harosoy x Kingwa	"Kingwa - Rps"
OX708: L62-361* x Harosoy 63	*Rps_1*
OX900: Blackhawk x Harosoy 63	*Rps_1*
Indiana lines (supplied by Dr. K. L. Athow)	
PRX5-206 (Harosoy x PI 84,637)	*$Rps_1{}^b$*
PRX8-5 (Harosoy x PI 86,972-1)	*Rps_3*
Other	
PI 86,050 (Athow et al., 1980)	*$Rps_1{}^c$*, *Rps_4*
Sanga	*$Rps_1{}^b$*

*Dt_2 selection from Harosoy^6 x T117.

Table 3

F_2 segregations for an expected 3:1 ratio involving the L62-904 gene

Cross	Race	Resistant		Susceptible		Chi-square	P
		O	E	O	E		
L62-904 x OX708	3	38	43.5	20	14.5	2.30	0.20-0.10
L62-904 x OX900	3	40	43.5	18	14.5	0.83	0.40-0.30

O = Observed E = Expected

Table 4

F_2 segregations for an expected 9:3:3:1 ratio involving Rps_1^b and the L62-904 gene

Cross	Reaction to races 2 and 6-7				Chi-square	P
	RR	RS	SR	SS		
L62-904 x Sanga						
Observed	59	27	21	10		
Expected	71.4	23.8	23.8	7.9	3.47	0.50-0.30
L62-904 x PRX5-206*						
Observed	66	18	13	10		
Expected	60.1	20.1	20.1	6.7	4.75	0.20-0.10

*PRX5-206 is (Harosoy x PI 84,637).

Table 5

F_2 segregations for an expected 15:1 ratio involving the L62-904 gene and various other genes

Cross	Race	Resistant O	Resistant E	Susceptible O	Susceptible E	Chi-square	P
Rps_1							
L62-904 x OX708 + OX900	1	107	108.8	9	7.2	0.25	0.60-0.50
Rps_3							
L62-904 x PRX8-5	4	56	55.3	3	3.7	0.12	0.80-0.70
Rps_4							
L62-904 x PI86,050*	4	64	67.5	8	4.5	2.13	0.20-0.10
Altona - Rps							
L62-904 x OX693	4	105	103.1	5	6.9	0.30	0.60-0.50
Kingwa - Rps							
L62-904 x OX696	3,4,5	54	54.4	4	3.6	0.05	0.90-0.80

*F_2 seedlings inoculated as described by Ward et al. (1979); other crosses were F_3 seedling tests of F_2 plants using hypocotyl wounding/mycelium insertion (Buzzell et al., 1977).

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1) An allelism study of the inheritance of the lack of soybean lectin in five soybean lines.

Pull et al. (1978) found five soybean lines ('Columbia', 'Norredo', 'Sooty', T102 and 'Wilson-5') lacking the 120,000 dalton seed lectin, also called soybean lectin (SBL). Orf et al. (1978) established that the lack of SBL is inherited as a simple recessive, *le le*. The homozygous dominant